Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

KAURI GUM MINING IN NEW ZEALAND

R. A. F. PENROSE, Jr.

Several years ago, while on a trip to New Zealand, the writer had an opportunity to see something of what is known as kauri gum mining in that country. This industry consists of digging a resinous material which in bygone times has exuded from kauri trees and has become imbedded in the soil or subsoil, where it exists in a fossil condition, often in remarkably large quantities.

The kauri tree (*Agathis australis* Salisbury; *Dammara australis* Lambert) is characteristic of certain parts of New Zealand, though it is confined geographically to narrow limits, and is most abundant from Cape North southward to the Auckland peninsula, in about latitude 37° S., a distance of about 200 miles, where its gigantic size makes it the monarch of the forests. It is found but rarely south of latitude 38° S. It occurs most plentifully at rather low altitudes, and is rare at elevations of over 1,500 feet, though some trees have been found at 2,500 feet or more.[1]

The kauri tree has a straight, symmetrical trunk, rising frequently from eighty to one hundred feet in height and sometimes even as much as one hundred and twenty-five or one hundred and fifty feet. In diameter the full-grown tree varies from four to twelve feet, while in extreme cases it may measure twenty feet or more. The top of the tree is large and spreads out in heavy branches, while the trunk is comparatively smooth, with a gray bark which peels off and collects in heaps at the base of the tree. The kauri is not so large as some of the largest of the redwood (*Sequoia*) trees of California, but it occupies the same position of prominence in the New Zealand forests as do the latter on the western coast of the United States. Like the redwoods also it is very valuable for lumber, and many of the once magnificent forests have been cut down, but enough remain to attest to their former grandeur.

---

[1] T. Kirk, *The Forest Flora of New Zealand*, Wellington, N.Z. (1889), p. 150.

The so-called kauri gum is really a true resin and not a gum, but the latter term has become so generally used that it is here retained. The material is a solidified turpentine which exudes from the tree as a clear, transparent liquid and hardens rapidly on exposure to the air, assuming then a dull white or slightly yellowish appearance. It collects in large quantities on all parts of the trees, on the leaves, in masses on the branches and trunk, and throughout the bark. The heaps of bark that peel off and collect on the ground are saturated with it and become solidified. These fresh exudations, however, supply very little of the gum of commerce, most of the latter being a fossil gum which has come from the secretions of the kauri trees, and has accumulated in the soil of the forests, or in the clay or other formations below the soil. It is of a light or dark brown color, sometimes almost black, transparent to translucent in luster, generally more or less homogeneous in character, but sometimes including leaves, sticks, and insects. There is a popular impression in New Zealand that the fossil gum, through some process underground, has become purer than the fresh gum from the trees.

Kauri gum occurs both in regions now covered, or which have until recently been covered, with kauri forests, and also where no kauri trees have been known to grow in historic times, but where they existed in bygone ages and have been destroyed by fire, submergence, or other causes. In fact, the larger part of the kauri gum mined in New Zealand is derived from open country, called "gumfields," destitute of any considerable timber, while the old roots and other parts of trees found under the soil prove that kauri forests once existed there. It is generally supposed that in such cases the forests were destroyed by fire, and the burned character of the remains of the trees found with the gum lends some evidence to such an hypothesis. On the other hand, it has been suggested that a fire that would destroy a forest would also destroy such an inflammable material as the gum; but it must be remembered that the gum that had become buried in the soil would be more or less protected from fire. Moreover, the gum is so abundant that though much of it might be destroyed in a burning forest, yet much might escape.

In some places gum is found in the ground underlying forests in which few or no kauri trees occur, but its origin is shown by its occasional association with the remnants of kauri trees and by inclusions of leaves. In such instances the original kauri forests have long since disappeared and the present flora represents a subsequent growth. A remarkable case of this is described by Mr. Bagnall[1] at Turua, in New Zealand, where a forest composed mostly of kahikatea trees covers an area in which kauri gum is remarkably abundant. The gum is often more or less charred by heat and is associated with the remains of kauri trees. Mr. Bagnall thinks that some of the kahikatea trees in this region are not less than one thousand years old; and though parts of this forest may have existed before the kauri forest disappeared, yet we see in this case a suggestion that possibly gum deposits may sometimes be of

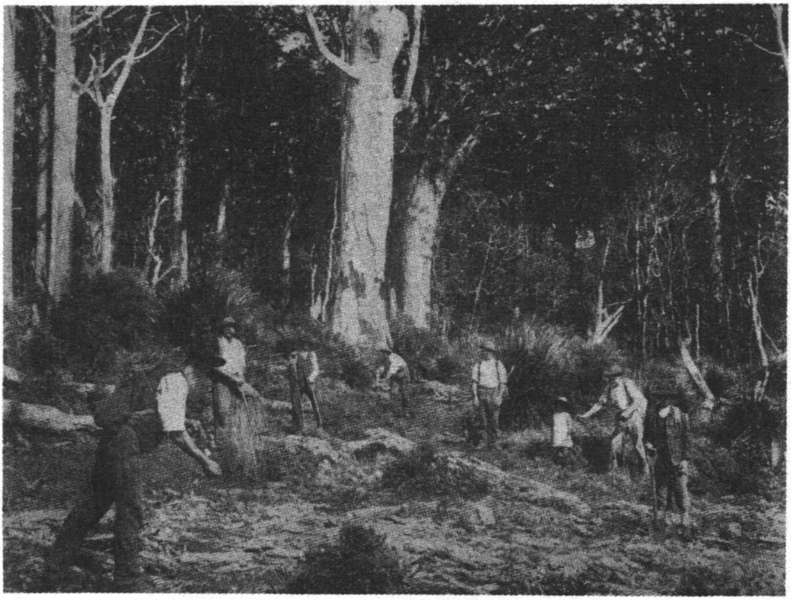

FIG. 1.—Kauri gum mining in New Zealand

---

[1] L. J. Bagnall, "Notes on the Occurrence of Kauri-Gum in the Kahikatea Forest at Turua," *Trans. and Proceed., New Zealand Institute*, XXIX (1896), 412–13.

considerable age. In the locality in question, the gum was so abundant that as much as half a ton is said to have been taken from twelve square feet of ground.

Kauri gum also often occurs in swamps covering buried forests of kauri trees. New Zealand is a volcanic country, and frequent movements in the earth's crust occur, so that many kauri forests which once flourished on dry ground may become partly or wholly submerged, and may die and eventually be buried in swamps. The same result may occur where a lava flow obstructs a stream, forming a lake, which inundates a kauri forest. The lake may eventually be filled up, first becoming a swamp and then perhaps dry land again, inclosing the dead trees with the earthy accumulations. In either case accumulations of kauri gum may occur with the remains of the old forests.

Considerable kauri gum is also obtained in districts from which the kauri lumber has only recently been cut, while some is mined in the soil of still standing kauri forests, and a certain amount has been obtained by tapping the trees, but the practices of mining in living forests and of tapping have been largely prohibited as injurious to the trees.

The gum usually lies from a few inches to several feet in the soil or underlying clays and sands, though sometimes it is exposed on the surface. A depth of from two to four feet is common, and a greater depth is often encountered. On the dry uplands it is usually shallower than in the swamps, where it may sometimes be twelve feet or more in depth. It occurs in irregular lumps, from a few ounces to several pounds in weight, lumps of from ten to twelve pounds being not uncommon, and in rarer cases lumps of as much as fifty or one hundred pounds have been found. It is in very variable quantities in the soil, being in some places too scattered to work profitably, in others abundant.

In some places successive layers of clay or sand carrying gum have been found, one above the other and separated by barren layers. Sometimes there are three or four of these gum layers and they represent the sites of former kauri forests which have been successively destroyed. The gum from each forest accumulated in the soil and became more or less covered with earthy matter which served to separate it from the next layer of gum formed from the next succeeding forest. In many gum fields, which were supposed to be exhausted when the top layer was worked out, the discovery of lower layers of gum has added fresh activity to the industry.

Kauri gum mining, or "gumming" as it is often called, is generally looked on as a rather poor occupation by the New Zealanders, and is often resorted to by people out of employment, or by miners who have not been successful in locating gold, silver, or other more permanent mines, and have taken to gum mining to get the means of continuing their prospecting. In this way the industry has afforded many a poor man funds to bridge over times of distress. There is in parts of New Zealand quite a large Austrian population, and these people have often been active in the gum industry, at times making considerable profits from it. The native Maoris resort to gum mining at idle times or when their crops fail. Gum mining is a simple process, and requires but little equipment, so

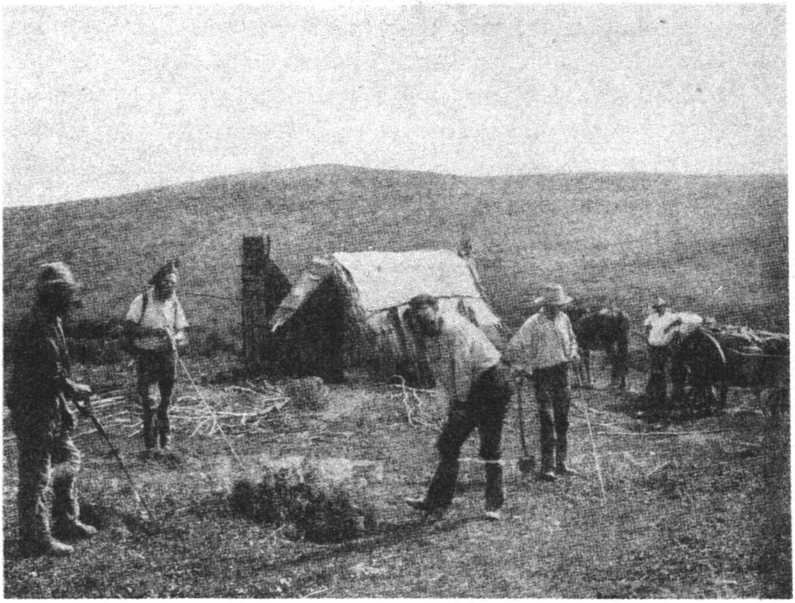

FIG. 2.—Kauri gum mining in New Zealand

that it is peculiarly fitted for those operating without capital. A long pointed iron or steel rod, or spear, is used to explore the soil, and is stuck into the ground from spot to spot, until a lump of gum is located, which is then dug out by a spade. In swampy land, where the gum is in soft mud, a hook is sometimes used to pick it out. Where gum is very abundant the whole ground is sometimes dug up without "spearing" or "hooking."

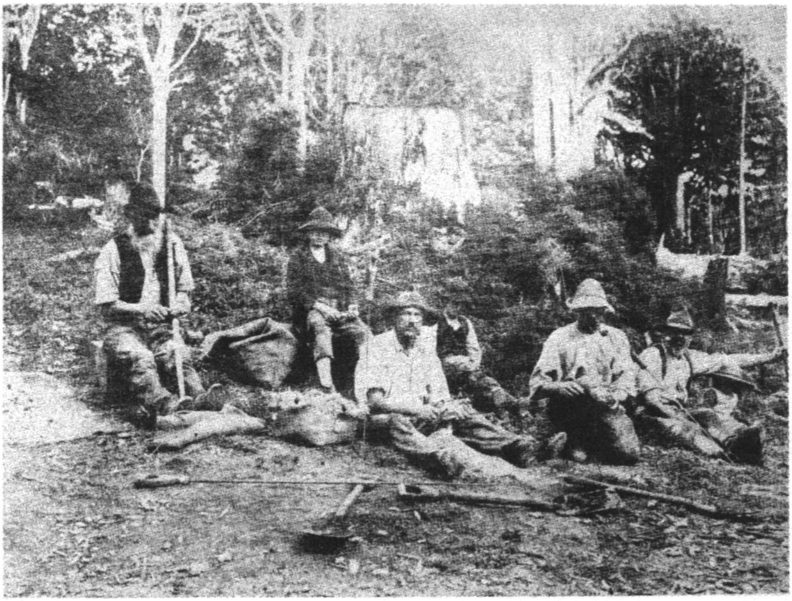

FIG. 3.—Preparing kauri gum in New Zealand

Kauri gum mining began about 1847 and has continued ever since with varying annual productions. The production in 1856 was 1,440 tons; in 1893 it was 8,317 tons;[1] in 1903 it was 9,357 tons, and in 1910 it was 8,693[2] tons. Up to the end of 1906 the total product of kauri gum in New Zealand has been estimated at 275,319 tons, valued at £13,443,017.[3] The price of the gum has had

[1] *New Zealand Official Yearbook*, 1900.

[2] Statistics of the Dominion of New Zealand, 1910.

[3] J. M. Bell and E. deC. Clarke, "The Geology of the Whangaroa Subdivision, Hokianga Division," *New Zealand Geol. Survey* (1909), p. 96.

a tendency to rise since its early production, on account of its increased use and the limited supply. In recent years the price has ranged from £50 to £70 per ton for the higher grades of gum.

Kauri gum is used mostly in the manufacture of varnishes as a substitute for copal and mastic. Formerly it was shipped mostly to England and America, but later much of it began to be used locally in New Zealand. Some of the clear transparent or translucent varieties are used as a substitute for amber in the mouthpieces of pipes, cigar and cigarette holders, and a certain amount is used for carving small ornaments.

Reports are often heard of the approaching exhaustion of the gumfields, but the production still keeps up. Many of the districts have been exhausted, but others have been discovered, and many of the forest regions in which "gumming" is prohibited on account of the injury it does to the timber, may become available later when the timber is cut. It is probable that for many years to come gum mining will be an important industry in New Zealand.